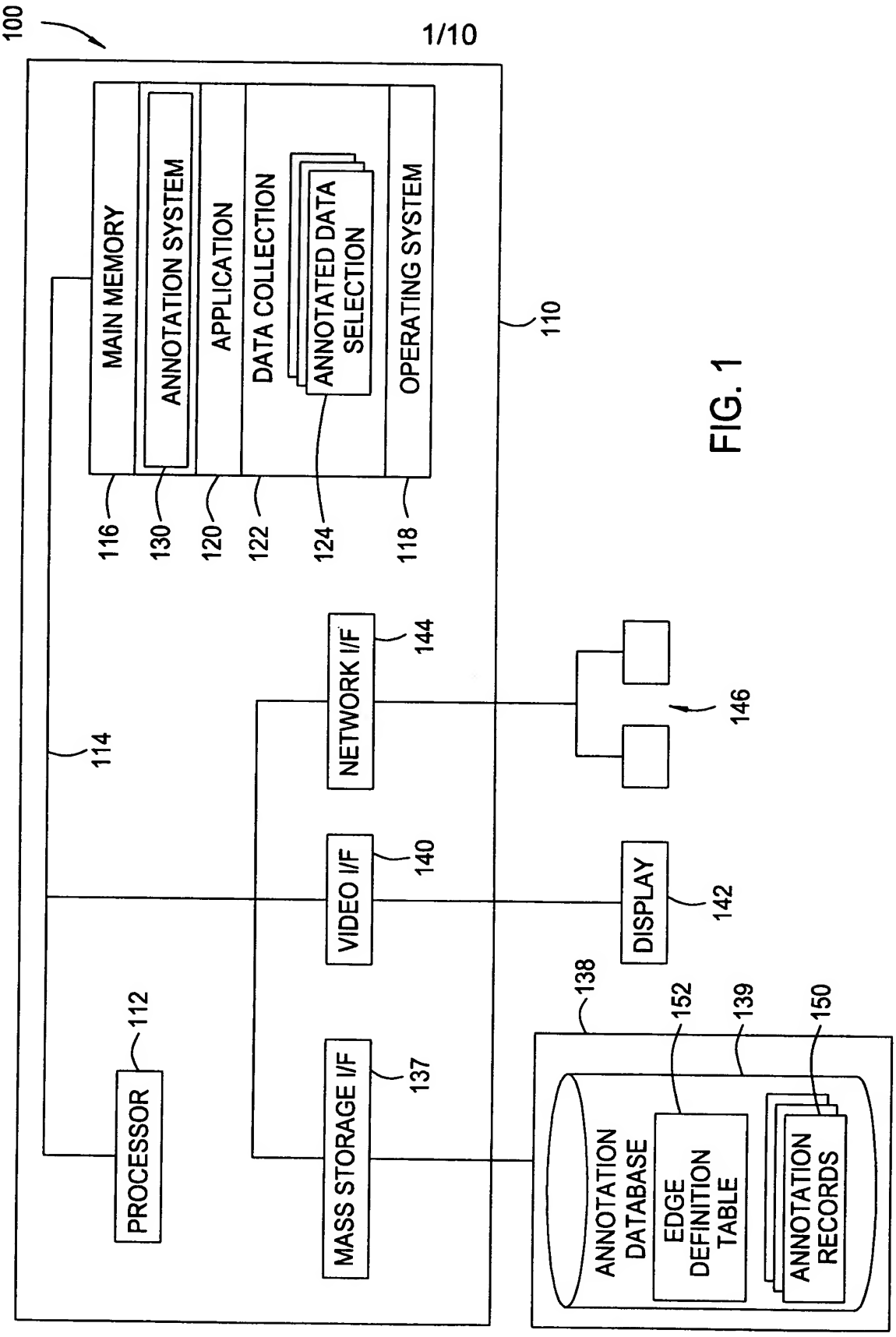

100
MAIN MEMORY
ANNOTATION SYSTEM
APPLICATION
DATA COLLECTION
ANNOTATED DATA SELECTION
OPERATING SYSTEM
110
116
130
120
122
124
118
114
NETWORK I/F
144
146
VIDEO I/F
140
DISPLAY
142
PROCESSOR
112
MASS STORAGE I/F
137
138
152
139
150
ANNOTATION DATABASE
EDGE DEFINITION TABLE
ANNOTATION RECORDS

FIG. 1

122

PRIMARY KEY	COLUMN A	COLUMN B	COLUMN C	COLUMN D	COLUMN E
1	DATA	DATA	DATA	DATA	DATA
2	DATA	DATA	DATA	DATA	DATA
3	DATA	DATA	DATA	DATA	DATA
4	DATA	DATA	DATA	DATA	DATA
5	DATA	DATA	DATA	DATA	DATA
6	DATA	DATA	DATA	DATA	DATA
7	DATA	DATA	DATA	DATA	DATA
8	DATA	DATA	DATA	DATA	DATA
9	DATA	DATA	DATA	DATA	DATA
10	DATA	DATA	DATA	DATA	DATA
11	DATA	DATA	DATA	DATA	DATA
12	DATA	DATA	DATA	DATA	DATA

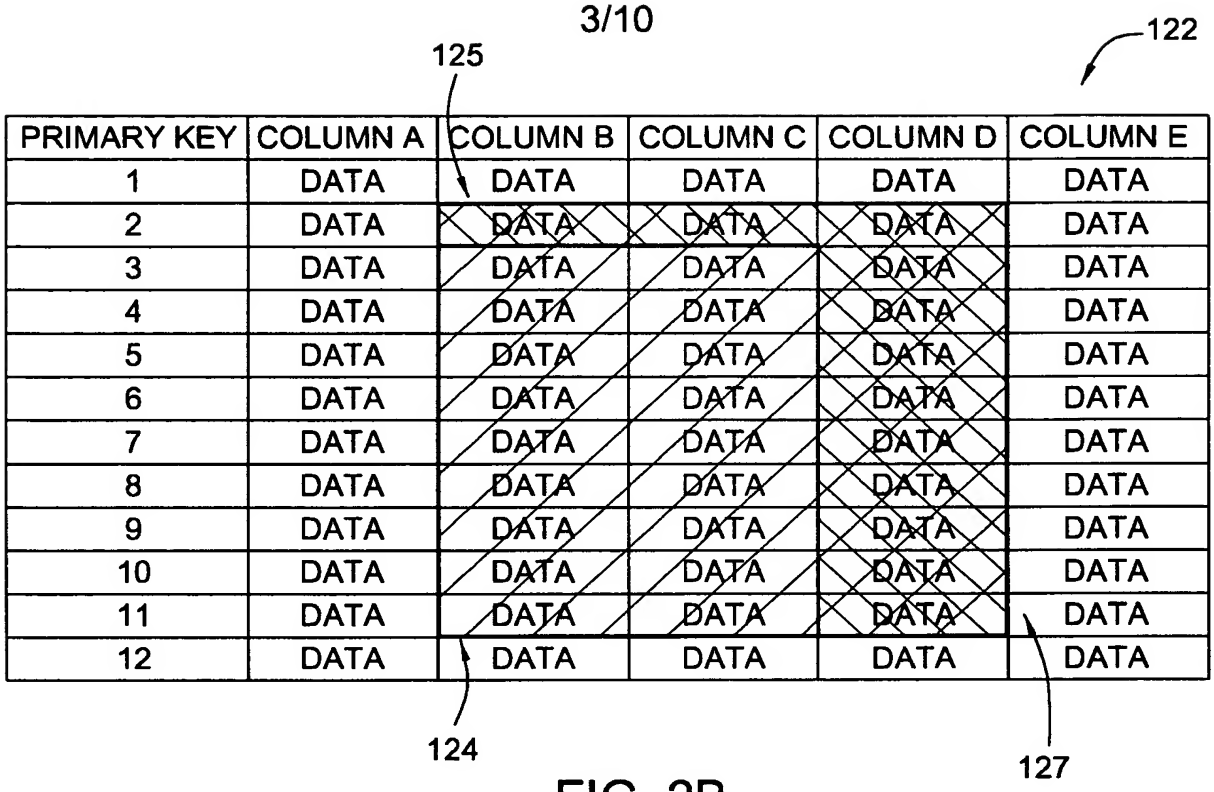
124

FIG. 2A

154A

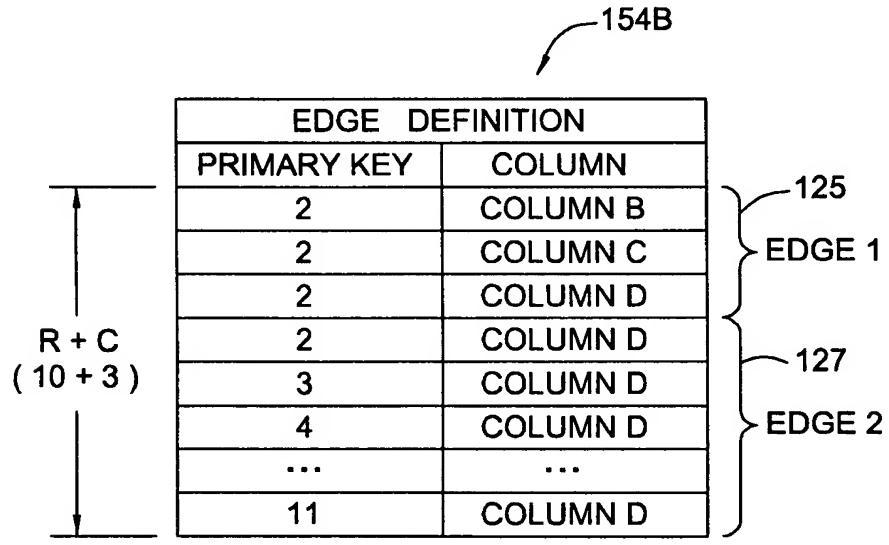
CONVENTIONAL SELECTED DATA DESCRIPTION	
PRIMARY KEY	COLUMN
2	COLUMN B
2	COLUMN C
2	COLUMN D
3	COLUMN B
...	...
11	COLUMN D

R x C
(3 x 10)



PRIMARY KEY	COLUMN A	COLUMN B	COLUMN C	COLUMN D	COLUMN E
1	DATA	DATA	DATA	DATA	DATA
2	DATA	DATA	DATA	DATA	DATA
3	DATA	DATA	DATA	DATA	DATA
4	DATA	DATA	DATA	DATA	DATA
5	DATA	DATA	DATA	DATA	DATA
6	DATA	DATA	DATA	DATA	DATA
7	DATA	DATA	DATA	DATA	DATA
8	DATA	DATA	DATA	DATA	DATA
9	DATA	DATA	DATA	DATA	DATA
10	DATA	DATA	DATA	DATA	DATA
11	DATA	DATA	DATA	DATA	DATA
12	DATA	DATA	DATA	DATA	DATA

FIG. 2B



EDGE DEFINITION	
PRIMARY KEY	COLUMN
2	COLUMN B
2	COLUMN C
2	COLUMN D
2	COLUMN D
3	COLUMN D
4	COLUMN D
...	...
11	COLUMN D

PRIMARY KEY	COLUMN A	COLUMN B	COLUMN B'	COLUMN C	COLUMN D	COLUMN E
1	DATA	DATA	DATA	DATA	DATA	DATA
2	DATA	DATA	DATA	DATA	DATA	DATA
3	DATA	DATA	DATA	DATA	DATA	DATA
4	DATA	DATA	DATA	DATA	DATA	DATA
5	DATA	DATA	DATA	DATA	DATA	DATA
5.5	DATA	DATA	DATA	DATA	DATA	DATA
6	DATA	DATA	DATA	DATA	DATA	DATA
7	DATA	DATA	DATA	DATA	DATA	DATA
8	DATA	DATA	DATA	DATA	DATA	DATA
9	DATA	DATA	DATA	DATA	DATA	DATA
10	DATA	DATA	DATA	DATA	DATA	DATA
11	DATA	DATA	DATA	DATA	DATA	DATA
12	DATA	DATA	DATA	DATA	DATA	DATA

FIG. 2C

154C

EDGE DEFINITION (CONTIGUOUS)	
PRIMARY KEY LIST	2,3,4,5,6,7,8,9,10,11
COLUMN LIST	B,C,D

PRIMARY KEY	COLUMN A	COLUMN B	COLUMN C	COLUMN D	COLUMN E	COLUMN F	COLUMN G
1	DATA	DATA	DATA	DATA	DATA	DATA	DATA
2	DATA	DATA	DATA	DATA	DATA	DATA	DATA
3	DATA	DATA	DATA	DATA	DATA	DATA	DATA
4	DATA	DATA	DATA	DATA	DATA	DATA	DATA
5	DATA	DATA	DATA	DATA	DATA	DATA	DATA
6	DATA	DATA	DATA	DATA	DATA	DATA	DATA
7	DATA	DATA	DATA	DATA	DATA	DATA	DATA
8	DATA	DATA	DATA	DATA	DATA	DATA	DATA
9	DATA	DATA	DATA	DATA	DATA	DATA	DATA
10	DATA	DATA	DATA	DATA	DATA	DATA	DATA
11	DATA	DATA	DATA	DATA	DATA	DATA	DATA
12	DATA	DATA	DATA	DATA	DATA	DATA	DATA

FIG. 2D

154D

EDGE DEFINITION (DISCONTIGUOUS)				
	PARTITION 1	PARTITION 2	PARTITION 3	PARTITION 4
PRIMARY KEY LIST	2,3,4,5	6,7	6,7	8,9,10,11
COLUMN LIST	B,C,D,E,F	B,C	E,F	B,C,D,E,F

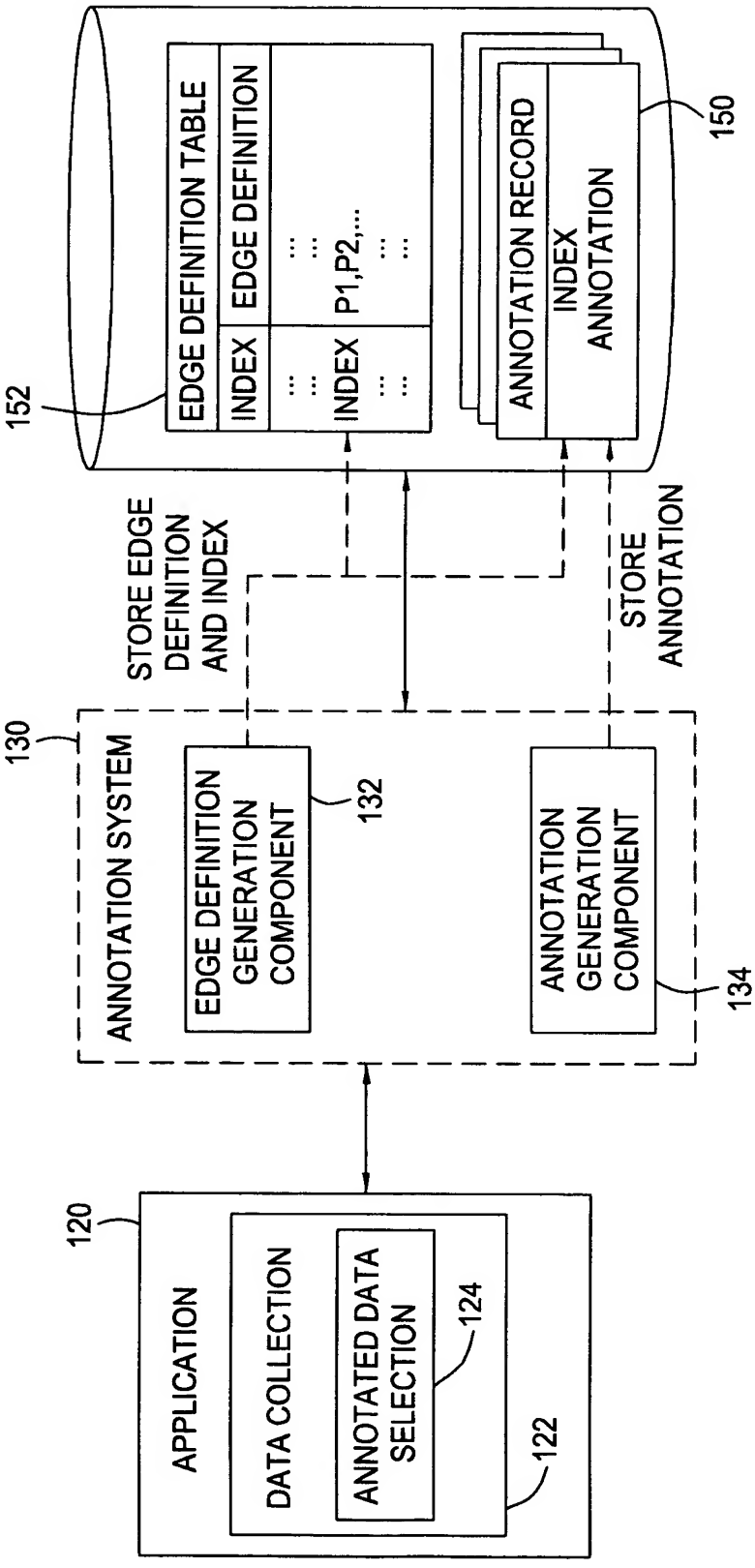

EDGE DEFINITION TABLE
INDEX
EDGE DEFINITION
INDEX
P1,P2,...
ANNOTATION RECORD
INDEX
ANNOTATION
150
152
STORE EDGE DEFINITION AND INDEX
STORE ANNOTATION
130
ANNOTATION SYSTEM
EDGE DEFINITION GENERATION COMPONENT
132
ANNOTATION GENERATION COMPONENT
134
120
APPLICATION
DATA COLLECTION
ANNOTATED DATA SELECTION
124
122

FIG. 3

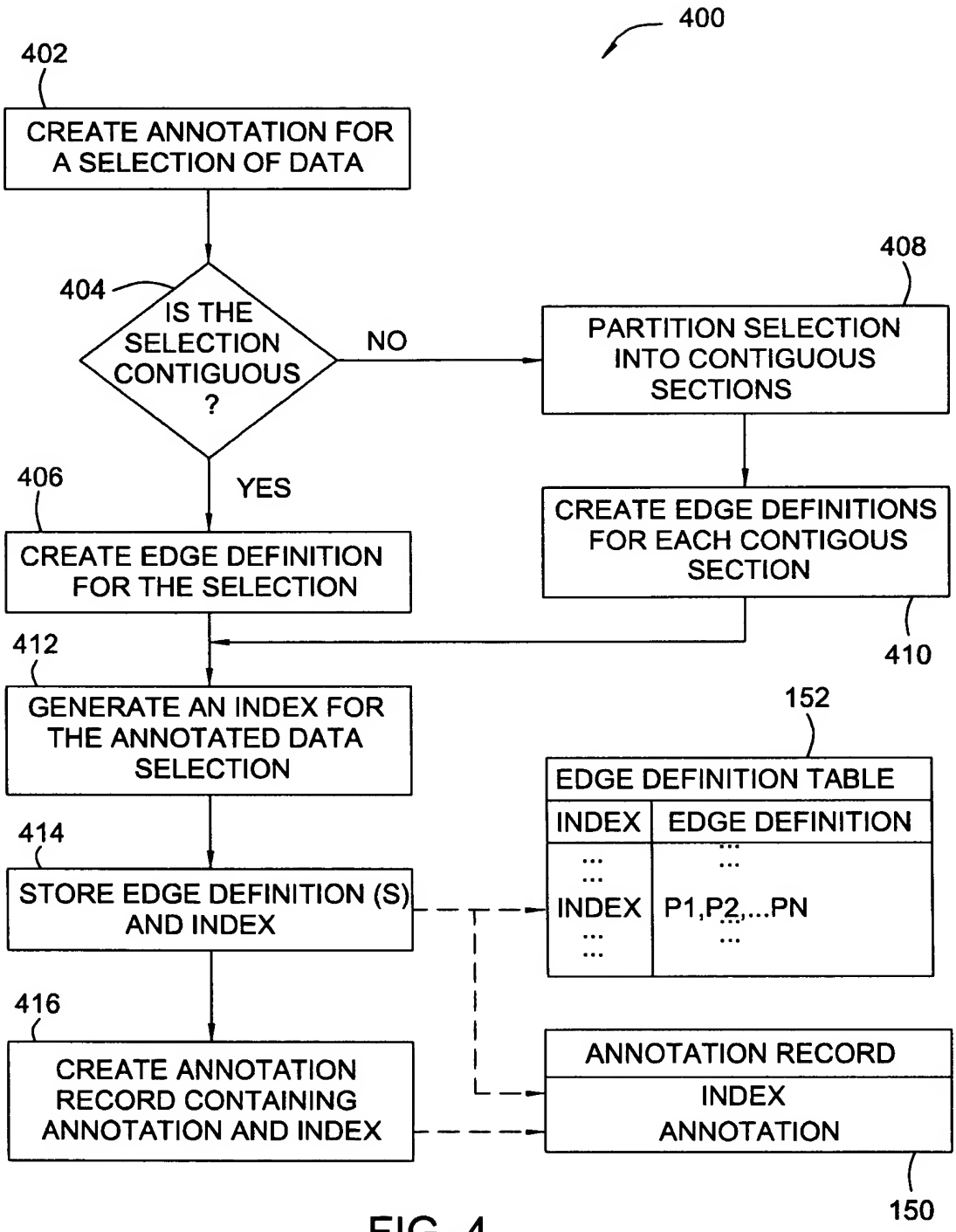

400
402
CREATE ANNOTATION FOR A SELECTION OF DATA
404
IS THE SELECTION CONTIGUOUS ?
NO
YES
408
PARTITION SELECTION INTO CONTIGUOUS SECTIONS
406
CREATE EDGE DEFINITION FOR THE SELECTION
CREATE EDGE DEFINITIONS FOR EACH CONTIGOUS SECTION
410
412
GENERATE AN INDEX FOR THE ANNOTATED DATA SELECTION
152
EDGE DEFINITION TABLE
INDEX
EDGE DEFINITION
INDEX
P1,P2,...PN
414
STORE EDGE DEFINITION (S) AND INDEX
416
CREATE ANNOTATION RECORD CONTAINING ANNOTATION AND INDEX
ANNOTATION RECORD
INDEX
ANNOTATION
150

FIG. 4

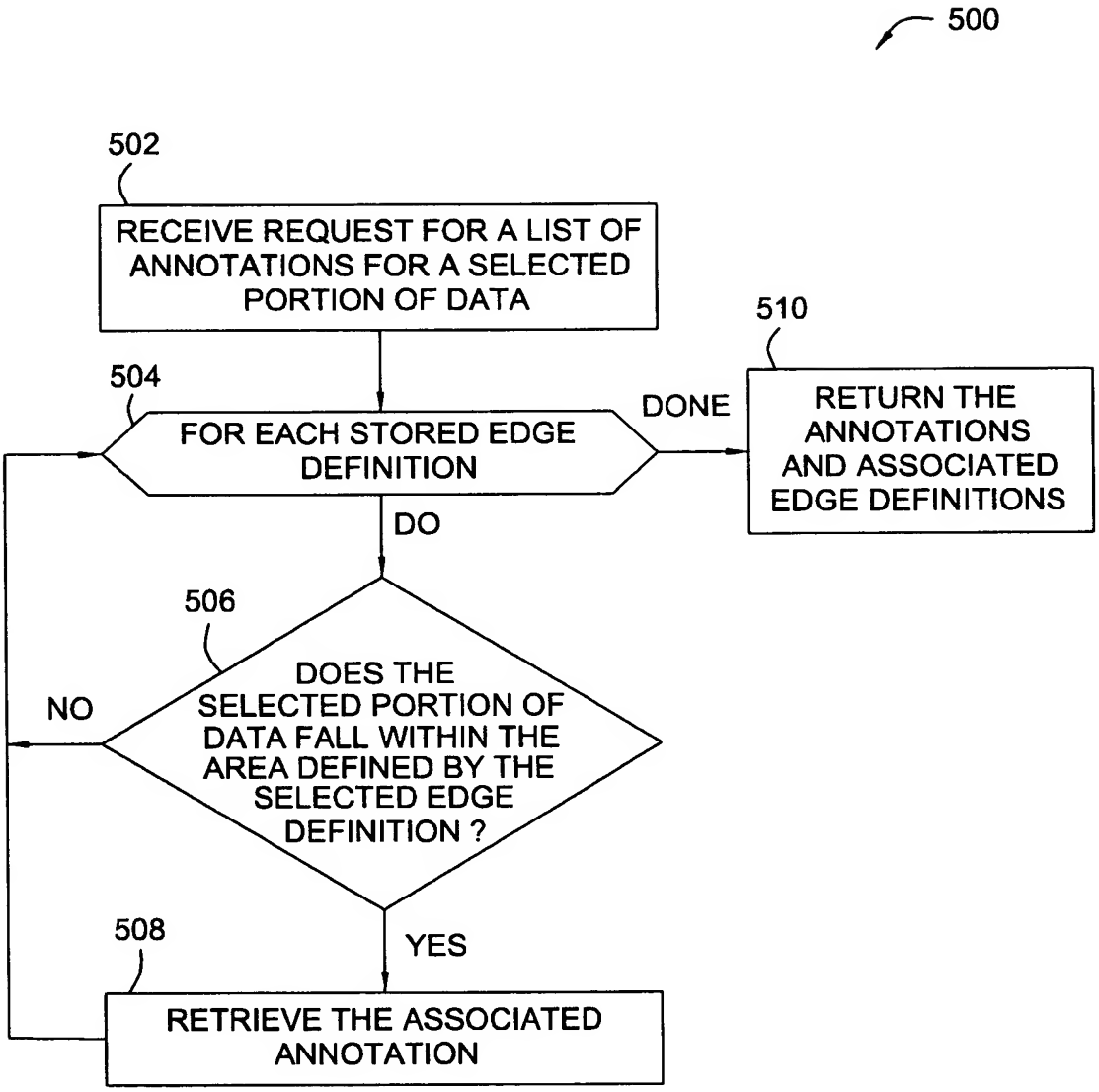

500
502
RECEIVE REQUEST FOR A LIST OF ANNOTATIONS FOR A SELECTED PORTION OF DATA
504
FOR EACH STORED EDGE DEFINITION
DONE
510
RETURN THE ANNOTATIONS AND ASSOCIATED EDGE DEFINITIONS
DO
506
DOES THE SELECTED PORTION OF DATA FALL WITHIN THE AREA DEFINED BY THE SELECTED EDGE DEFINITION ?
NO
YES
508
RETRIEVE THE ASSOCIATED ANNOTATION

FIG. 5

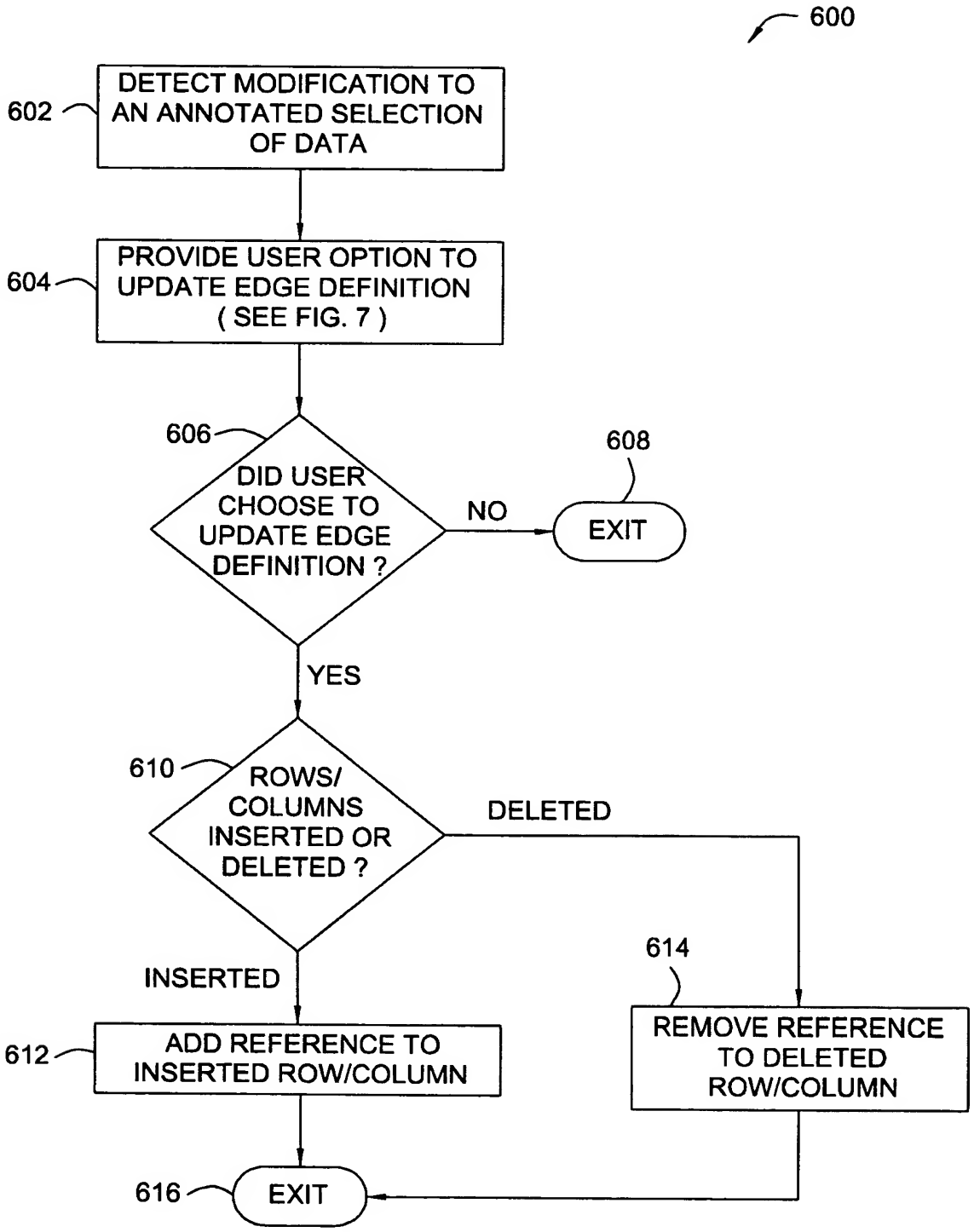

600
602
DETECT MODIFICATION TO AN ANNOTATED SELECTION OF DATA
604
PROVIDE USER OPTION TO UPDATE EDGE DEFINITION (SEE FIG. 7)
606
DID USER CHOOSE TO UPDATE EDGE DEFINITION ?
NO
608
EXIT
YES
610
ROWS/ COLUMNS INSERTED OR DELETED ?
DELETED
INSERTED
612
ADD REFERENCE TO INSERTED ROW/COLUMN
614
REMOVE REFERENCE TO DELETED ROW/COLUMN
616
EXIT

FIG. 6

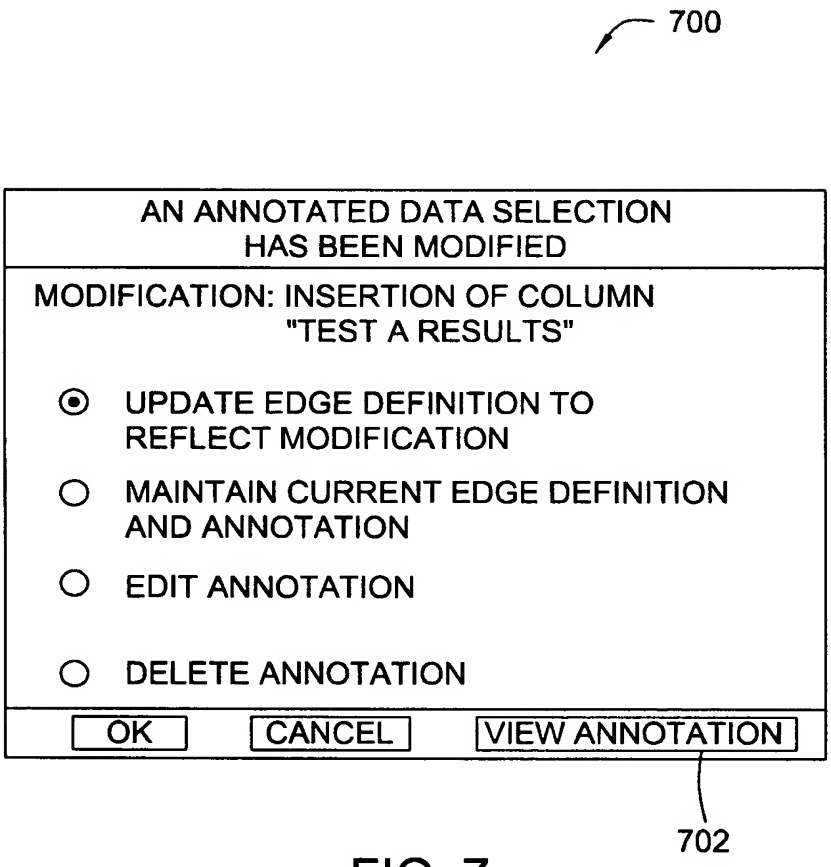

700
AN ANNOTATED DATA SELECTION HAS BEEN MODIFIED
MODIFICATION: INSERTION OF COLUMN "TEST A RESULTS"
UPDATE EDGE DEFINITION TO REFLECT MODIFICATION
MAINTAIN CURRENT EDGE DEFINITION AND ANNOTATION
EDIT ANNOTATION
DELETE ANNOTATION
OK
CANCEL
VIEW ANNOTATION
702

FIG. 7